GENERIC SCAN TOOL

GENERAL INFORMATION FOR ON BOARD DIAGNOSTIC (OBD)

Characteristics of On Board Diagnostic (OBD)

The control module for Diesel-Direct fuel injection system is equipped with a DTC memory.

If malfunctions occur at the emission relevant systems or components, they are stored in DTC memory with a description of the malfunction type.

The control module for Diesel-Direct fuel injection system differentiates between different DTCs after evaluating the information. See **DIAGNOSTIC TROUBLE CODE (DTC) TABLES:** .

The stored malfunctions can be checked with a standard diagnostic tester. See **DIAGNOSTIC MODE 3: CHECK DTC MEMORY** .

When harness connectors are disconnected from the control module for Diesel-Direct fuel injection system or the battery is disconnected, all adaptation values in the control module are erased. DTC memory content will remain intact however. If the engine is started after this, rough, uneven idle can result. In this case, the readiness code must be generated again. See **READINESS CODE, GENERATING** .

The following work steps must be performed in the described sequence after the malfunction(s) have been repaired:

1. - Check DTC memory. See **DIAGNOSTIC MODE 3: CHECK DTC MEMORY** .
2. - Erase DTC memory. See **DIAGNOSTIC MODE 4: RESET/ERASE DIAGNOSTIC DATA** .
3. - For completion, generate readiness code. See **READINESS CODE, GENERATING** .

On Board Diagnostic (OBD), technical data

Control module identification

The control module version is displayed by selecting "Diagnostic mode 9: Vehicle information" under address word 33. See **DIAGNOSTIC MODE 9: VEHICLE INFORMATION** .

Equipment of control module for Diesel-Direct fuel injection system

Equipment Of Control Module Identification

Engine Code	ALH model year up to 04.99	ALH Model year from 05.99 and up
System identification	EDC (Electronic Diesel	EDC (Electronic Diesel

	Control)	Control)
Equipment of control module for Diesel-Direct fuel injection system	80	121
Emissions limiting values according to	Tier 1(1)	Tier 1(1)
On Board Diagnostic (OBD)	OBD II	OBD II
DTC memory	Permanent memory(2)	Permanent memory(2)
Memory for adaptation values	Temporary memory(3)	Temporary memory(3)
Intake manifold change-over	No	No
Camshaft adjustment	No	No
Boost pressure regulation	Yes	Yes
Exhaust Gas Recirculation (EGR)	Yes	Yes

(1) Tier 1 = Non-Low Emission Vehicles (emission values max. 0.25 g/mi HC)

(2) Independent of voltage supply.

(3) Values are erased when voltage supply is interrupted.

Selectable diagnostic modes under address word 33 - OBD

NOTE: The conditions required for selecting the desired diagnostic mode are listed in the following table:

Diagnostic Modes Under Address Word 33

Diagnostic mode			**Requirement:**		
Selectable diagnostic modes under address word 33-OBD			• engine off • Ignition switched on	• Engine running at idle	• Vehicle in drive mode
Mode 1:	Check measured values	See **DIAGNOSTIC MODE 1: CHECK MEASURED VALUES** .	Yes	Yes	Yes
Mode 2:	Check operating conditions	See **DIAGNOSTIC MODE 2: CHECK OPERATING CONDITIONS** .	Yes	Yes	Yes
Mode 3:	Check DTC Memory	See **DIAGNOSTIC MODE 3: CHECK DTC MEMORY** .	Yes(1)	Yes	Yes
Mode 4:	Reset/erase diagnostic data	See **DIAGNOSTIC MODE 4: RESET/ERASE DIAGNOSTIC DATA** .	Yes	Yes	Yes
Mode 6:	Check test results of components	See **DIAGNOSTIC MODE 6: CHECK TEST**	Yes(2)	Yes(2)	Yes(2)

	that are not continuously monitored	**RESULTS OF COMPONENTS THAT ARE NOT CONTINUOUSLY MONITORED** .			
Mode 7:	Check test results of components that are continuously monitored	See **DIAGNOSTIC MODE 7: CHECK TEST RESULTS OF COMPONENTS THAT ARE CONTINUOUSLY MONITORED** .	Yes(1)	Yes	Yes
Mode 9:	Vehicle information	See **DIAGNOSTIC MODE 9: VEHICLE INFORMATION** .	Yes	Yes	Yes

(1) Perform only with ignition switched on when engine does not start (operate starter beforehand for at least 6 seconds).

(2) Test-ID 10 and Test-ID 12 can only be performed with engine at standstill and ignition switched on.

Diagnostic Tester, connecting

Recommended special tools and equipment:

- VAS 5052 Vehicle Diagnostic and Information System with

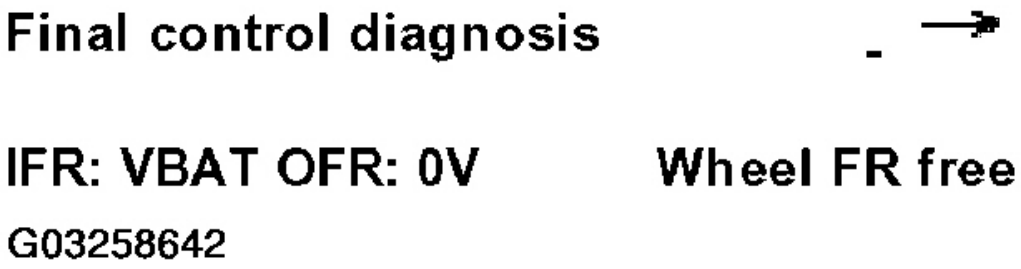

Fig. 1: Identifying Special Tool VAS 5052
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- VAS 5052/3 diagnostic cable

Requirements

- The respective fuses of Diesel-Direct fuel injection system must be OK.

NOTE: Fuse holder is located behind access panel at far left end of dash.

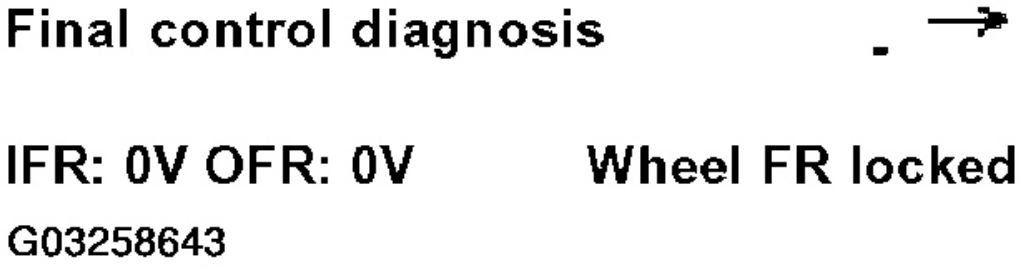

Fig. 2: Identifying Fuses
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- Battery voltage must be at least 11.5 Volts.
- All electrical consumers such as, for example, lights and rear window defroster must be switched off.
- Parking brake must be engaged or else daylight driving lights will be switched on.
- For vehicles with automatic transmission, selector lever must be in position -P- or -N-.
- If vehicle is equipped with an A/C system, it must be switched off.
- Ground (GND) connections between engine and chassis must be OK.
- Ignition switched off.

Work procedure

Connect diagnostic tester (VAS 5052) using (VAS 5052/3) diagnostic cable as follows:

- Connect diagnostic cable connector to Data Link Connector (DLC) -arrow-.

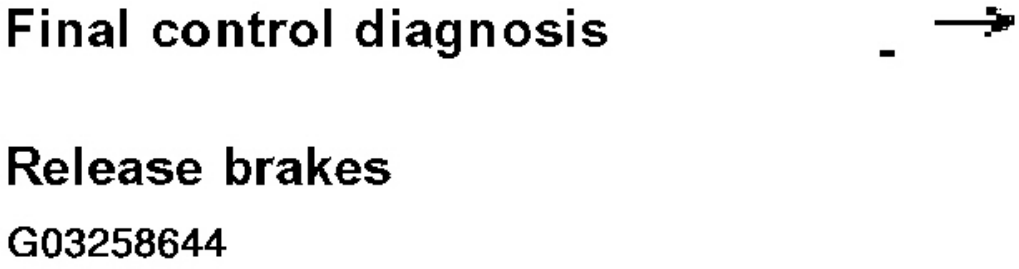

Fig. 3: Locating Data Link Connector
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- Depending on the desired diagnostic mode, it is necessary to:switch on ignition or start engine and let it run at idle. See **Selectable diagnostic modes under address word 33 - OBD** .

NOTE:

- **Respective operation of the diagnostic tester:**
- **If no display appears on diagnostic tester, check voltage supply at Diagnostic Link Connector (DLC).**

Test box, connecting for wiring test

Recommended special tools and equipment:

Vehicles with 80-pin control module

- VAG1598/22 test box

Fig. 4: Identifying VAG1598/22 Test Box
Courtesy of VOLKSWAGEN OF AMERICA, INC.

Vehicles with 121-pin control module

- VAG1598/31 test box

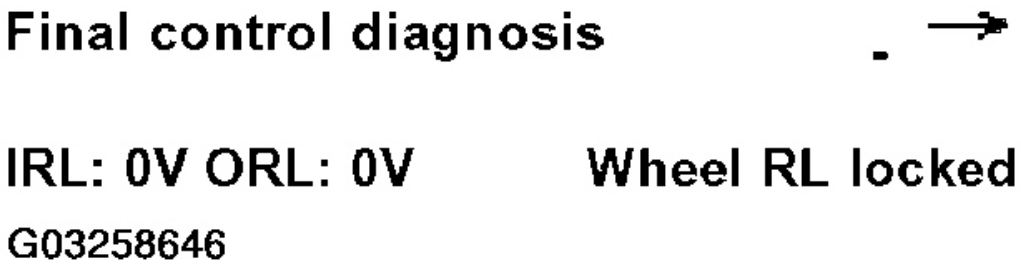

Fig. 5: Identifying VAG1598/31 Test Box
Courtesy of VOLKSWAGEN OF AMERICA, INC.

Requirement

- Ignition switched off.

Work procedure

- Remove inner cover of plenum chamber, left side:
- Then disengage connector from control module and disconnect.

Vehicles with 80-pin control module

- Connect VAG1598/22 test box at control module wiring harness.

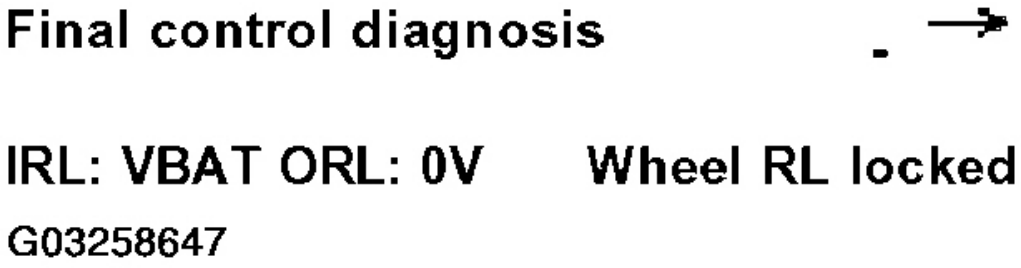

Fig. 6: Connecting VAG1598/22 Test Box At Control Module Wiring Harness
Courtesy of VOLKSWAGEN OF AMERICA, INC.

Vehicles with 121-pin control module

- Connect VAG1598/31 test box at control module wiring harness. The control module for Diesel -Direct fuel injection system is not connected during this.

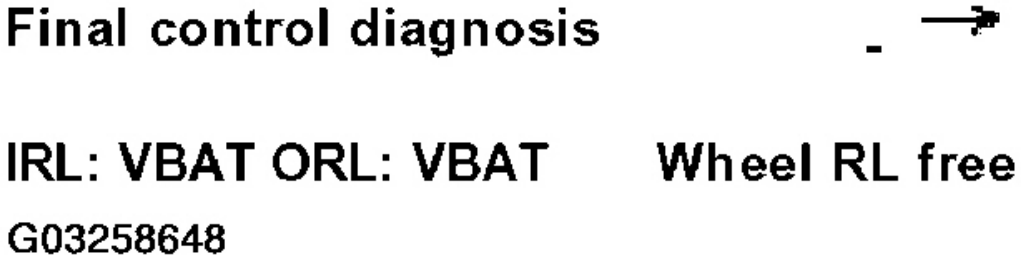

Fig. 7: Connecting VAG1598/31 Test Box At Control Module Wiring Harness
Courtesy of VOLKSWAGEN OF AMERICA, INC.

Continuation for all vehicles

When harness connectors are disconnected from the control module for Diesel-Direct fuel injection system or the battery is disconnected, all adaptation values in the control module are erased. DTC memory content will remain intact however. If the engine is started after this, rough, uneven idle can result. In this case, the readiness code must be generated again. See **READINESS CODE, GENERATING** .

Malfunction Indicator Lamp (MIL) in instrument cluster

Meaning of exhaust MIL

The Malfunction Indicator Lamp (MIL) lights up when exhaust relevant malfunctions are recognized by the control module for Diesel-Direct fuel injection system.

Component location of exhaust MIL:

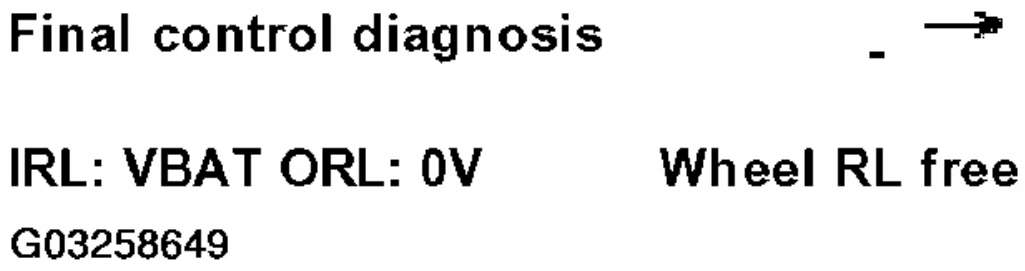

Fig. 8: Identifying Location Of Exhaust Malfunction Indicator Lamp
Courtesy of VOLKSWAGEN OF AMERICA, INC.

1. Exhaust Malfunction Indicator Lamp (MIL)
2. Glow Plug Indicator Light

Glow Plug Indicator Light has a dual function:

- Blinking: Malfunctions were detected which influence drivability.
- Lighting up when ignition is switched on: Normally appears when starting up a cold diesel engine.

NOTE:

- **The exhaust Malfunction Indicator Lamp (MIL) is switched on as soon as malfunctions are detected that increases emissions. DTC memory must be checked in this case. See DIAGNOSTIC MODE 3: CHECK DTC MEMORY .**
- **DTC memory must still be checked if there are drivability problems or customer complaints and the MIL is not lit, since malfunctions can be stored without causing the MIL to light immediately.**

DIAGNOSTIC MODE, SELECTING

Recommended special tools and equipment:

- VAS 5052 Vehicle Diagnostic and Information System with

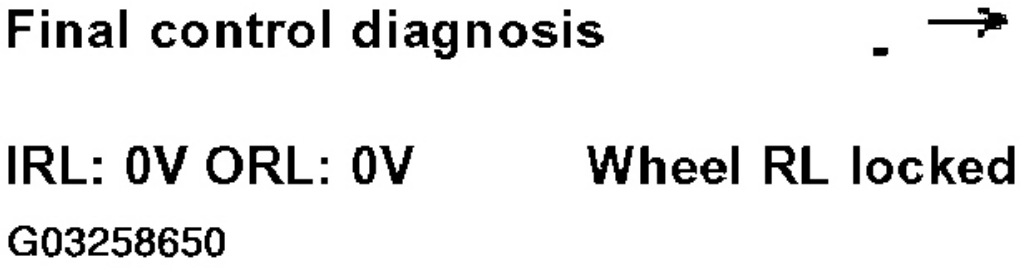

Fig. 9: Identifying Special Tool VAS 5052 Vehicle Diagnostic And Information System
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- VAS 5052/3 diagnostic cable

Address word 33 - On-Board Diagnostic (OBD)

Function

Via the diagnostic tester, different diagnostic modes can be selected under "address word 33 - On-Board Diagnostic (OBD)".

The following diagnostic modes monitor all components and systems which influence the emission quality.

Diagnostic mode 1: Check measured values

Requirement

- Coolant temperature must be at least 80 °C, PID 5, Coolant temperature.

Work procedure

- Connect diagnostic tester. See **DIAGNOSTIC TESTER, CONNECTING** .
- Depending on the desired operating condition: switch on ignition

  or start engine and let run at idle.

- Under address word 33, select "Diagnostic mode 1: Check measured values."
- Select the desired measured value(s) "PID XX".

NOTE:

- **The specified values for the respective measuring values can be found at the respective component and function tests.**

- **The following list only serves as an overview.**
- **The measured values are sorted according to the PID (parameter-identifications).**

Diagnostic Mode 1 - PID Measured Values

PID	Display measuring values
01:	Monitoring status since erasing DTC memory
04:	Calculated load condition value
05:	Coolant temperature
11:	Intake manifold pressure
12:	Engine rotations per minute (RPM)
13:	Vehicle speed
14:	Valve timing adjustment at 1. cyl. to "advance"
15:	Intake Air Temperature (IAT)
16:	Air flow quantity at Mass Air Flow (MAF) sensor
17:	Throttle valve position (absolute)
28:	OBD requirement for which this vehicle is designed
33:	Distance driven with MIL on (km)

- End diagnosis and switch ignition off.

Diagnostic mode 2: Check operating conditions

Function

This diagnostic mode displays the operating conditions at which an emission relevant malfunction was detected and stored by the control module for Diesel-Direct fuel injection system.

Work procedure

- Connect diagnostic tester. See **DIAGNOSTIC TESTER, CONNECTING** .
- Depending on the desired operating condition: switch on ignition

  or start engine and let run at idle.

- Under address word 33, select "Diagnostic mode 2: Check operating conditions."
- Select the desired operating condition(s) "PID XX".

NOTE: The operating conditions are sorted according to the PID (parameter-identifications).

Diagnostic Mode 2 - PID Operating Conditions

PID	Display operating conditions

02:	DTC which triggered the current reception of all control module information
04:	Calculated load condition value
05:	Coolant temperature
11:	Intake manifold pressure
12:	Engine rotations per minute (RPM)
13:	Vehicle speed
14:	Valve timing adjustment at 1. cyl. to "advance"
15:	Intake Air Temperature (IAT)
16:	Air flow quantity at Mass Air Flow (MAF) sensor
17:	Throttle valve position (absolute)

If DTCs are displayed in "PID 02":

- Repair stored malfunctions according to DTC table:
- SAE P0xxx-DTCs. See **SAE P0xxx-DTCs** .
- End diagnosis and switch ignition off.

Diagnostic mode 3: Check DTC Memory

Function

This diagnostic mode indicates all stored DTCs of components and systems which are emission relevant.

Malfunction Indicator Lamp (MIL) in instrument cluster lights up for one DTC entry. See **MALFUNCTION INDICATOR LAMP (MIL) IN INSTRUMENT CLUSTER** .

SAE Diagnostic Trouble Codes (DTCs)

The DTC always consists of a 5-digit alpha-numeric value with the following meaning:

Component group:

- P0xxxx = DTC for drivetrain.

Norm-Code:

- P0xxx = DTCs defined by SAE with specified malfunction texts.

System group:

- Px0xx = Fuel and air ratio and additional emission regulations
- Px1xx = Fuel and air ratio.
- Px2xx = Fuel and air ratio.

- Px3xx = Ignition system.
- Px4xx = additional emission regulation.
- Px5xx = Speed and idle control.
- Px6xx = Control module and output signals.
- Px7xx = Transmission.
- Px8xx = Transmission.
- Px9xx = Control modules, input and output signals.

Work procedure

- Connect diagnostic tester. See **DIAGNOSTIC TESTER, CONNECTING** .
- Start engine and let run at idle.

NOTE: Only if engine does not start:

- **Operate starter for approx. 6 seconds. Do not switch ignition off afterward.**

- Under address word 33, select "Diagnostic mode 3: Check DTC memory."

The number of stored malfunctions or "0 malfunctions detected" is displayed.

- End diagnosis and switch ignition off.
- Repair stored malfunctions according to DTC table:

- SAE P0xxx-DTCs. See **SAE P0xxx-DTCs** .

- Erase DTC memory. See **DIAGNOSTIC MODE 4: RESET/ERASE DIAGNOSTIC DATA** .

NOTE:

- **The DTC table is sorted by SAE codes.**
- **"Emission"-relevant malfunctions are additionally indicated in the instrument cluster via the Malfunction Indicator Lamp (MIL). See MALFUNCTION INDICATOR LAMP (MIL) IN INSTRUMENT CLUSTER .**
- **In Diagnostic mode 2, it can be determined at which operating condition a malfunction was detected and stored by the control module for Diesel-Direct fuel injection system. See DIAGNOSTIC MODE 2: CHECK OPERATING CONDITIONS .**
- **Erase DTC memory after repairing malfunction DIAGNOSTIC MODE 4: RESET/ERASE DIAGNOSTIC DATA .**

Display example:

P0183 Fuel Temperature Sensor A Circuit High

Explanation:

- P0183 = SAE diagnostic trouble code (malfunction identification number).
- Fuel Temperature Sensor A = faulty circuit or malfunctioning component.
- Circuit High = malfunction type as text

Diagnostic mode 4: Reset/erase diagnostic data

Function

This diagnostic mode performs the following functions:

- all emission relevant malfunctions in DTC memory will be erased,
- the operating conditions at which a malfunction was stored will be reset. See **DIAGNOSTIC MODE 2: CHECK OPERATING CONDITIONS** .
- all adaptation values are being reset,
- all test results of the diagnostic functions are being reset.

Requirement

- DTC memory was checked. See **DIAGNOSTIC MODE 3: CHECK DTC MEMORY** .

Work procedure

- Connect diagnostic tester. See **DIAGNOSTIC TESTER, CONNECTING** .
- Start engine and let run at idle.
- Under address word 33, select "Diagnostic mode 4: Reset/erase diagnostic data."

Erased or reset:

- Number and content of the DTC memories,
- Operating conditions,
- Adaptation values,
- Test results.

- End diagnosis and switch ignition off.
- Generate readiness code. See **READINESS CODE, GENERATING** .

Diagnostic mode 6: Check test results of components that are not continuously monitored

Function

This diagnostic mode displays the test results of emission relevant components and systems which are not continuously monitored.

The values of the individual test results must reach the specified value or must be within the min.- and max.-limits.

Diagnostic Mode 6 Tests

Test-ID	Component, System	Test
09:	Coolant temperature plausibility	See **TEST-ID 09: COOLANT TEMPERATURE PLAUSIBILITY** .
10:	Start-Stop positions test of quantity adjuster	See **TEST-ID 10: START-STOP POSITIONS TEST OF QUANTITY ADJUSTER** .
11:	Fuel temperature plausibility	See **Test-ID 11: Fuel temperature plausibility** .
12:	Plausibility test of Manifold Absolute Pressure (MAP)/Barometric Pressure	See **TEST-ID 12: PLAUSIBILITY TEST OF MANIFOLD ABSOLUTE PRESSURE (MAP)/BAROMETRIC PRESSURE** .

Test-ID 09: Coolant temperature plausibility

Test requirements

- There must not be any DTCs stored in DTC memory. See **DIAGNOSTIC MODE 3: CHECK DTC MEMORY** .
- Coolant temperature must not be above the maximum of 20 °C. See **DIAGNOSTIC MODE 1: CHECK MEASURED VALUES** ; PID 5, Coolant temperature.

Work procedure

- Read readiness code. See **READ READINESS CODE** .
- Let engine run at idle.
- Under address word 33, select "Diagnostic mode 6: Check test results of components that are not continuously monitored".
- Select the "Test -ID 09: Coolant temperature plausibility".
- Increase engine speed to approx. 1800 RPM.
- Check specified values.

Evaluation test-ID 09 Coolant temperature plausibility

EVALUATION TEST-ID 09

Test-ID 09	Specified value: min.	max.
• Timeframe of diagnostic cycle	-	117 or 46(1)
• Temperature change during diagnostic cycle	8	-
Temperature at end of diagnostic cycle	57	-
(1) Independent of coolant temperature.		

- End diagnosis and switch ignition off.

If specified values are not obtained:

- Check Engine Coolant Temperature (ECT) Sensor -G62-. See **ENGINE COOLANT TEMPERATURE (ECT) SENSOR, CHECKING** .
- Erase DTC memory of control module for Diesel - Direct fuel injection system. See **DIAGNOSTIC MODE 4: RESET/ERASE DIAGNOSTIC DATA** .
- Generate readiness code. See **READINESS CODE, GENERATING** .

Test-ID 10: Start-Stop positions test of quantity adjuster

Test requirements

- There must not be any DTCs stored in DTC memory **DIAGNOSTIC MODE 3: CHECK DTC MEMORY** .
- Fuel temperature must be at least 10 °C.
- Battery voltage must be at least 11.5 Volts.

Work procedure

- Read readiness code. See **READ READINESS CODE** .
- Switch ignition on.
- Under address word 33, select "Diagnostic mode 6: Check test results of components that are not continuously monitored".
- Select the "Test-ID 10: Start-Stop positions test of quantity adjuster".
- Check the specified values with ignition switched on.

Evaluation test-ID 10 Start-Stop positions test of quantity adjuster

EVALUATION TEST-ID 10

Test-ID 10	Specified value:	
	min.	max.
• Return message of quantity adjuster in MAX-position	-	242
• Return message of quantity adjuster in MAX-position	212	-
• Return message of quantity adjuster in MIN-position	-	49
• Return message of quantity adjuster in MIN-position	25	-

- End diagnosis and switch ignition off.

If specified values are not obtained:

- Check Modulating Piston Displacement Sensor -G149- and Quantity Adjuster -N146-. See

MODULATING PISTON DISPLACEMENT SENSOR AND QUANTITY ADJUSTER, CHECKING .

- Erase DTC memory of control module for Diesel-Direct fuel injection system. See **DIAGNOSTIC MODE 4: RESET/ERASE DIAGNOSTIC DATA** .
- Generate readiness code. See **READINESS CODE, GENERATING** .

Test-ID 11: Fuel temperature plausibility

Test requirements

- There must not be any DTCs stored in DTC memory. See **DIAGNOSTIC MODE 3: CHECK DTC MEMORY** .

Work procedure

- Read readiness code. See **READ READINESS CODE** .
- Let engine run at idle.
- Under address word 33, select "Diagnostic mode 6: Check test results of components that are not continuously monitored".
- Select the "Test-ID 11: Fuel temperature plausibility".
- Check specified values at idle.

Evaluation test-ID 11 Fuel temperature plausibility

EVALUATION TEST-ID 11

Test-ID 11	Specified value:	
	min.	max.
• Timeframe of diagnostic cycle	-	120
• Temperature change in current driving cycle	100	-
• Temperature integral at end of diagnostic cycle	300	-

- End diagnosis and switch ignition off.

If specified values are not obtained:

- Check Fuel Temperature Sensor -G81-. See **FUEL TEMPERATURE SENSOR, CHECKING** .
- Erase DTC memory of control module for Diesel - Direct fuel injection system. See **DIAGNOSTIC MODE 4: RESET/ERASE DIAGNOSTIC DATA** .
- Generate readiness code. See **READINESS CODE, GENERATING** .

Test-ID 12: Plausibility test of Manifold Absolute Pressure (MAP)/Barometric Pressure

Test requirements

- There must not be any DTCs stored in DTC memory. See **DIAGNOSTIC MODE 3: CHECK DTC MEMORY** .

Work procedure

- Read readiness code. See **READ READINESS CODE** .
- Switch ignition on.
- Under address word 33, select "Diagnostic mode 6: Check test results of components that are not continuously monitored".
- Select the "Test-ID 12: Plausibility test of Manifold Absolute Pressure (MAP)/Barometric Pressure".
- Check the specified values with ignition switched on.

Evaluation test-ID 12 Plausibility test of Manifold Absolute Pressure (MAP)/Barometric Pressure

EVALUATION TEST-ID 12

Test-ID 12	Specified value: min.	Specified value: max.
• Absolute difference of Manifold Absolute Pressure (MAP) to Barometric Pressure	-	150

- End diagnosis and switch ignition off.

  If specified values are not obtained:

- Check Manifold Absolute Pressure (MAP) Sensor -G71- and Barometric Pressure (BARO) Sensor -F96-. See **MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR AND BAROMETRIC PRESSURE (BARO) SENSOR, CHECKING** .
- Erase DTC memory of control module for Diesel - Direct fuel injection system. See **DIAGNOSTIC MODE 4: RESET/ERASE DIAGNOSTIC DATA** .
- Generate readiness code. See **READINESS CODE, GENERATING** .

Diagnostic mode 7: Check test results of components that are continuously monitored

Function

This diagnostic mode indicates all stored DTCs of components and systems which are continuously monitored.

Requirement

- There must not be any DTCs stored in DTC memory. See **DIAGNOSTIC MODE 3: CHECK DTC MEMORY** .

Work procedure

- Connect diagnostic tester. See **DIAGNOSTIC TESTER, CONNECTING** .
- Start engine and let run at idle.

NOTE: Only if engine does not start:

- **Operate starter for approx. 6 seconds. Do not switch ignition off afterward.**

- Under address word 33, select "Diagnostic mode 7: Check test results of components that are continuously monitored".

  The number of stored malfunctions or "0 malfunctions detected" is displayed.

- End diagnosis and switch ignition off.

- Repair stored malfunctions according to DTC table:

- SAE P0xxx-DTCs. See **SAE P0xxx-DTCs** .

NOTE:

- **The DTC table is sorted by SAE codes.**
- **Erase DTC memory after repairing malfunction. See DIAGNOSTIC MODE 4: RESET/ERASE DIAGNOSTIC DATA .**

Diagnostic mode 9: Vehicle information

Function

In this diagnostic mode, vehicle specific diagnostic data such as e.g. the control module versions will be displayed.

Requirement

- There must not be any DTCs stored in DTC memory. See **DIAGNOSTIC MODE 3: CHECK DTC MEMORY** .

Work procedure

- Connect diagnostic tester. See **DIAGNOSTIC TESTER, CONNECTING** .
- Switch ignition on.
- Under address word 33, select "Diagnostic mode 9: vehicle information".
- Select desired vehicle information "Test-ID XX".

Display vehicle information

DISPLAY VEHICLE INFORMATION

Test-ID	Diagnostic text
02:	Vehicle Identification Number (VIN)(1) example: • WVWSP61J22W000225
04:	Calibration identification example: • 022906032CR 0005 Identification of control module for Diesel-Direct fuel injection system
06	CVN (control module-check sum) example: • 76E80034 the check sum is different for every control module version • No results
(1) Display occurs only for vehicles as of model year 2002.	

- End diagnosis and switch ignition off.

READINESS CODE

Function

The readiness code is an 8 digit number block that indicates the status of emission relevant diagnostics.

If a diagnostic for a system has run through successfully, the respective digit of the number block is set from 1 to 0.

Diagnostics are performed at regular intervals during normal vehicle operation. After repairing an exhaust relevant system, the readiness code should be generated via a road test to ensure that these systems are working according to specifications. If a malfunction is recognized during diagnostic, it is stored in DTC memory.

The readiness code is erased every time DTC memory is erased or when voltage supply is interrupted. DTC memory should therefore only be erased when there are DTCs stored.

Read readiness code

Requirements

- There must not be any DTCs stored in DTC memory. See **DIAGNOSTIC MODE 3: CHECK DTC MEMORY** .
- Coolant temperature must be at least 80 °C **DIAGNOSTIC MODE 1: CHECK MEASURED VALUES** ; PID 5, Coolant temperature.

Work procedure

- Connect diagnostic tester. See **DIAGNOSTIC TESTER, CONNECTING** .

- Start engine and let run at idle.
- Under address word 33, select "Diagnostic mode 1: Check measured values."
- select desired measuring value "PID 01".
- Observe the right 8-digit number block:

If all diagnoses have run through successfully, the 8-digit number block

Specified value: 00000000 must be displayed.

Evaluation PID 01: System status-information (right 8-digit number block:)

EVALUATION PID 01: SYSTEM STATUS-INFORMATION

Meaning if display position = 0								
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Diagnostic function**
0								Exhaust gas recirculation OK
	0							Oxygen sensor heater OK • not available/always "0"
		0						Oxygen sensors OK • not available/always "0"
			0					A/C system OK • not available/always "0"
				0				Secondary Air Injection (AIR) system OK • not available/always "0"
					0			EVAP canister system (tank ventilation system) OK • not available/always "0"
						0		Catalytic converter heater OK • not available/always "0"
							0	Catalytic converter OK • not available/always "0"

If a 1 is displayed instead of a 0 in the 8-digit number block:

- Generate readiness code. See **READINESS CODE, GENERATING** .

Readiness code, generating

Requirements

- The respective fuses of Diesel-Direct fuel injection system must be OK.

NOTE: Fuse holder is located behind access panel at far left end of dash.

Fig. 10: Identifying Fuses
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- Battery voltage must be at least 11.5 Volts.
- All electrical consumers such as, for example, lights and rear window defroster must be switched off.
- If vehicle is equipped with an A/C system, it must be switched off.
- Ground (GND) connections between engine and chassis must be OK.
- There must not be any DTCs stored in DTC memory. See **DIAGNOSTIC MODE 3: CHECK DTC MEMORY** .

Work procedure

- Connect diagnostic tester. See **DIAGNOSTIC TESTER, CONNECTING** .
- Switch ignition on.
- Wait 5 seconds.
- Let engine run at idle.
- Wait 45 seconds.
- Perform a road test.

The following operating conditions must be met during this road test:

- With accelerator pedal depressed completely, accelerate vehicle in 3. gear or in driving mode "3" from 50 km/h to 120 km/h.
- Drive for 2 minutes in 4. gear or in driving mode "D" on a level driving surface at a constant vehicle speed with an engine speed of 1700 to 1900 RPM.

Observe the safety precautions that apply to road tests. See **SAFETY PRECAUTIONS** .

NOTE:

- **Vehicle speed. See DIAGNOSTIC MODE 1: CHECK MEASURED VALUES ; PID 13, Vehicle speed.**
- **Engine speed. See DIAGNOSTIC MODE 1: CHECK MEASURED VALUES ; PID 12, engine rotations per minute (RPM).**

- Park vehicle and switch off ignition.
- Wait 15 seconds.
- Switch ignition on.
- Wait 5 seconds.
- Let engine run at idle.
- Wait 45 seconds.
- Perform a road test anew.

The following operating conditions must be met during this road test:

- With accelerator pedal depressed completely, accelerate vehicle in 3. gear or in driving mode "3" from 50 km/h to 120 km/h.
- Drive for 2 minutes in 4. gear or in driving mode "D" on a level driving surface at a constant vehicle speed with an engine speed of 1700 to 1900 RPM.

  Observe the safety precautions that apply to road tests. See **SAFETY PRECAUTIONS** .

- Park vehicle and let engine run at idle for 3 minutes.
- Accelerator pedal must not be operated during this time.
- Read readiness code. See **READ READINESS CODE** .

If a 1 is displayed instead of a 0 in the 8-digit number block:

- Repeat complete work procedure. See **WORK PROCEDURE** .

DIAGNOSTIC TROUBLE CODE (DTC) TABLES:

SAE P0xxx-DTCs

Fuel and air ratios

DIAGNOSTIC TROUBLE CODES P0100-P0108

SAE-DTC	DTC text	Corrective action

P0100	Mass or Volume Air Flow Circuit	• Check Mass Air Flow (MAF) Sensor -G70-. See **MASS AIR FLOW (MAF) SENSOR, CHECKING** .
P0101	Mass or Volume Air Flow Circuit Range/Performance	
P0102	Mass or Volume Air Flow Circuit Low Input	
P0103	Mass or Volume Air Flow Circuit High Input	
P0105	Manifold Absolute Pressure/Barometric Pressure Circuit	• Check Manifold Absolute Pressure (MAP) Sensor -G71- and Barometric Pressure (BARO) Sensor -F96-. See **MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR AND BAROMETRIC PRESSURE (BARO) SENSOR, CHECKING** .
P0106	Manifold Absolute Pressure/Barometric Pressure Circuit Range/Performance	
P0107	Manifold Absolute Pressure/Barometric Pressure Circuit Low Input	
P0108	Manifold Absolute Pressure/Barometric Pressure Circuit High Input	

DIAGNOSTIC TROUBLE CODES P0116-P0128

SAE-DTC	DTC text	Corrective action
P0116	Engine Coolant Temperature Circuit Range/Performance	• Check Engine Coolant Temperature (ECT) Sensor -G62-. See **ENGINE COOLANT TEMPERATURE (ECT) SENSOR, CHECKING** . • Check coolant regulator: See **COOLING SYSTEM COMPONENTS, ENGINE SIDE** .
P0117	Engine Coolant Temperature Circuit Low	
P0118	Engine Coolant Temperature Circuit High	
P0128	Coolant Thermostat (Coolant Temperature Below Thermostat Regulating Temperature)	• Check coolant regulator: See **COOLING SYSTEM COMPONENTS, ENGINE SIDE** .

DIAGNOSTIC TROUBLE CODES P0181-P0183

SAE-DTC	DTC text	Corrective action
P0181	Fuel Temperature Sensor A Circuit Range/Performance	• Check Fuel Temperature Sensor -G81-. See **FUEL TEMPERATURE SENSOR, CHECKING** .
P0182	Fuel Temperature Sensor A Circuit Low	

P0183	Fuel Temperature Sensor A Circuit High	

Fuel and air ratios

Diagnostic Trouble Code P0216-P0246

SAE-DTC	DTC text	Corrective action
P0216	Injector/Injection Timing Control Circuit	• Check Cold Start Injector -N108-. See **COLD START INJECTOR, CHECKING** .
P0225	Throttle/Pedal Position Sensor/Switch "C" Circuit	• Check Throttle Position (TP) Sensor -G79- and Sender -2- for accelerator pedal position -G185-. See **THROTTLE POSITION (TP) SENSOR, CHECKING** .
P0226	Throttle/Pedal Position Sensor/Switch "C" Circuit Range/Performance	
P0228	Throttle/Pedal Position Sensor/Switch "C" Circuit High	
P0234	Turbo/Super Charger Overboost Condition	• Check Wastegate Bypass Regulator Valve -N75-. See **WASTEGATE BYPASS REGULATOR VALVE, CHECKING** .
P0245	Turbo/Super Charger Wastegate Solenoid "A" Low	
P0246	Turbo/Super Charger Wastegate Solenoid "A" High	

Diagnostic Trouble Code P0251-P0299

SAE-DTC	DTC text	Corrective action
P0251	Injection Pump Fuel Metering Control "A" (Cam/Rotor/Injector)	• Check Modulating Piston Displacement Sensor -G149- and Quantity Adjuster -N146-. See **MODULATING PISTON DISPLACEMENT SENSOR AND QUANTITY ADJUSTER, CHECKING** .
P0252	Injection Pump Fuel Metering Control "A" Range/Performance (Cam/Rotor/Injector)	• Check Cold Start Injector -N108-. See **COLD START INJECTOR, CHECKING** . • Check Needle Lift Sensor -G80-. See **NEEDLE LIFT SENSOR, CHECKING** .
P0299	Turbo/Super Charger Underboost	• Check Wastegate Bypass Regulator Valve -N75-. See **WASTEGATE BYPASS REGULATOR VALVE, CHECKING** .

Ignition system

DIAGNOSTIC TROUBLE CODES P0300-P0322

SAE-DTC	DTC text	Corrective action
P0300	Random/Multiple Cylinder Misfire Detected	• Check compression pressure See **COMPRESSION PRESSURE, CHECKING** . • Check fuel injectors. See **NEEDLE LIFT SENSOR, CHECKING** .
P0301	Cylinder 1 Misfire Detected	
P0302	Cylinder 2 Misfire Detected	
P0303	Cylinder 3 Misfire Detected	
P0304	Cylinder 4 Misfire Detected	
P0321	Ignition/Distributor Engine Speed Input Circuit Range/Performance	• Check Engine Speed (RPM) Sensor -G28-. See **CHECK ENGINE SPEED (RPM) SENSOR** .
P0322	Ignition/Distributor Engine Speed Input Circuit No Signal	

Additional exhaust regulation

DIAGNOSTIC TROUBLE CODES P0401-P0403

SAE-DTC	DTC text	Corrective action
P0401	Exhaust Gas Recirculation Flow Insufficient Detected	• Checking EGR Vacuum Regulator Solenoid Valve. See **EGR VACUUM REGULATOR SOLENOID VALVE, CHECKING** . • Check EGR Vacuum Regulator Solenoid Valve -N18-. See **CHECKING EGR VACUUM REGULATOR SOLENOID VALVE** .
P0402	Exhaust Gas Recirculation Flow Excessive Detected	
P0403	Exhaust Gas Recirculation Control Circuit	

Control module and output signals

DIAGNOSTIC TROUBLE CODES P0600-P0670

SAE-DTC	DTC text	Corrective action
P0600	Serial Communication Link	• Check terminal resistance for CAN-Bus. See **TERMINAL RESISTANCE FOR CAN-BUS, CHECKING** .
P0601	Internal Control Module Memory Check Sum Error	• Replace Diesel Direct Fuel Injection (DFI) Engine Control Module (ECM) -J248-. See **CONTROL MODULE FOR DIESEL-DIRECT FUEL INJECTION SYSTEM, REPLACING** .
P0605	Internal Control Module Read Only Memory (ROM) Error	
P0606	ECM/PCM Processor	
P0670	Glow Plug Module Control Circuit	• Check Control module for glow plug triggering -J370-

DIAGNOSTIC TROUBLE CODES P0671-P0674

SAE-DTC	DTC text	Corrective action
P0671	Cylinder 1 Glow Plug Circuit	• Check glow plug system. See **GLOW PLUG SYSTEM, CHECKING** . • Check glow plugs. See **GLOW PLUGS, CHECKING** .
P0672	Cylinder 2 Glow Plug Circuit	
P0673	Cylinder 3 Glow Plug Circuit	
P0674	Cylinder 4 Glow Plug Circuit	
P0670	Glow Plug Module Control Circuit	• Check Control module for glow plug triggering -J370-